

AMENDMENTS TO THE SPECIFICATION

Please amend the paragraph beginning at page 6, line 15 bridging page 7, line 5 as follows:

Material (A) - Polymers, copolymers, oligomers or monomers that are capable of reacting with halogen compounds or epoxy compounds, such as, polymers, copolymers, oligomers or monomers containing primary, secondary or tertiary amines. Especially preferred (A) materials secondary and tertiary amines that include polymers, copolymers, oligomers or monomers containing 6-membered aromatic heterocycles, 5-membered fused aromatic heterocycles and aromatic or non-aromatic secondary or tertiary amine compounds. Preferred 6-membered aromatic heterocycles include, for example, pyridine, pyridazine, pyrimidine, pyrazine and triazine compounds. Preferred 5-membered fused aromatic heterocycles include, for example, triazole, thiazole, and thiadiazole compounds. Preferred aromatic or non-aromatic secondary and tertiary amine compounds are those which contain five or more carbon atoms in addition to at least one nitrogen atom. Preferred aromatic tertiary amine compounds are heterocyclic amine group containing materials.

Please amend the paragraph beginning at page 9, line 23 bridging page 10, line 21, as follows:

It has also been found that rechargeable batteries with the gel polymer electrolyte surprisingly exhibited during storage a pre-charged voltage between about 0.4V to about 0.65V. In direct contrast, substantially no pre-charged cell voltage is exhibited by rechargeable batteries which employ pure liquid electrolytes. It was discovered that the nitrogen group ~~nitrogen-group~~ in the gel polymer electrolyte serves to increase the cell voltage before the cell is actually charged. No clear answer for this phenomenon is known, but it may be due to the neutralization of the electrolyte. In this regard, organic liquid electrolyte with LiPF_6 contains a small amount of hydrogen fluoride and Lewis acid, such as PF_3 . The nitrogen compound can thus easily capture the hydrogen fluoride and Lewis acid in the electrolyte. If the acids can partially oxidize anode active material to increase its potential to a level similar to LiCoO_2 , a cathode active material, then the liquid electrolyte can make the cell voltage near zero. The low potential of rechargeable batteries has been a problem because it corrodes the copper current collector at near zero voltage. Thus, rechargeable battery manufacturers cannot store the batteries for a long time after activating the batteries with liquid electrolyte. However, according to the present invention, gel polymer electrolytes provided with a relatively small amount of nitrogen-group containing compound as an additive will serve to maintain the cell voltage more than 0.3V thereby allowing for relatively long storage time storage before being charged. For this purpose, the necessary amount of nitrogen-group containing compound can be varied due to the concentration of acids in the electrolyte, but preferably is between about 0.01 to about 5.0 wt.%, based on the total weight of the gel polymer electrolyte.

Please amend the paragraph at page 11, lines 17-18 as follows:

The present invention will now be further described by the following non-limiting examples.

Please amend the paragraph at page 12, lines 7-9 as follows:

The anode, cathode and separator (25 μm , ~~Gellgard~~ Celgard[®] 2300 microporous film) were stacked or folded or winded and then placed into a plastic case capable of being heat-sealed.

Please amend the paragraph at page 12, lines 11-13 as follows:

A plastic case containing an anode, cathode and separator was prepared by the same procedure as in Example 1 except a polyethylene separator (13 μm , ~~Gellgard~~ Celgard[®] K835 microporous film) was used.

Please amend the paragraph beginning at page 13, line 14 bridging page 14, line 2 as follows:

The gel precursor electrolytes were prepared by the same procedure as in Example 3, except for a variation in the PVPS and DBX compositions. Several rechargeable polymer cells were prepared using the gel polymer electrolyte and , ~~Gellgard~~ Celgard[®] 2300 microporous film as a separator. In addition, a liquid electrolyte cell (Lithium Ion Battery) that did not contain PVPS and DBX was prepared to compare its performance with the gel polymer electrolyte cells in accordance with this

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invention. Table 2 below shows the electrolyte compositions, their gelling times at 65°C and ionic conductivities before and after gelling of the electrolytes. Table 2 also shows the respective open circuit voltage(OCV) for each cell after storage 24~ 36 hrs at 65 °C and their capacity retention at 1C-discharge rate. The charging upper voltage limit of the cells was 4.2V and discharge cutoff voltage was 3.0V.